

## Evaluation of Viability and Nutritive Value of *Indigofera tinctoria* as a Potential Animal Feeding in Aceh Province, Indonesia

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A series of studies related to animal feeding technology to stimulate the egg production and egg quality development of a cheap source of protein types and useful has been done through the evaluation of viability and nutritive value of *Indigofera tinctoria* and in vivo treatments on quail and chicken. Research conducted since October 2012 with a focus on increasing the ability to grow the *Indigofera*'s seed under soaking treatment in auxin hormone and testing the nutritional value on quail and chicken. The first study related to the viability testing is soaking the seed of *Indigofera* in auxin hormone before planting in the field. The study consisted of 4 treatments and 5 replications of soaking period, namely: control, B (12 hours), C (24 hours) and D (32 hours) in the field. The parameters measured were: viability and growth of seed and dry matter content of *Indigofera* leaf. The second study tested the nutritive value of *Indigofera* in the ration of laying chickens and quail. Treatments were: 0, 1, 2, 3, 4, and 5% of *Indigofera* leaf in the ration. Parameters observed in were: egg production, fertility, hatchability and Haugh unit. The results showed that the viability of the *Indigofera*'s seed with soaking treatment significantly increased to 80% and soaking for 32 hours resulted a higher viability. The treatment of soaking in auxin hormone increased nutrient content of *indigofera* leaf especially protein. In terms of nutritional value, supplement of *Indigofera* leaf was very useful to improve the production and quality of eggs in both local laying chickens and quail. Supplement of *Indigofera* leaf in the ration up to 5% also reduced the feed consumption and increased Haugh unit. From these results it was concluded that the viability of *Indigofera tinctoria* increased by soaking in auxin hormone for 12-32 hours. These treatments also stimulated the dry matter and protein contents in *Indigofera*'s leaf. Supplement of *Indigofera tinctoria* leaf as much as 1-5% in the ration also improved the egg production and quality of local chicken and quail. It was indicated that *Indigofera tinctoria* contains not only protein and amino acids but also vitamins and mineral for egg quality.

**Keywords:** *Indigofera*, quail, chicken, viability, nutrition

### Introduction

There is more pronounced in the poultry industry that cost production of rations is very high, above more than 70% due to the poultry ration contains a high protein requirements. Many attempts were made in an effort to meet the requirement of protein in rations by animal and cereal proteins materials but the condition is not satisfactory because of high price (Yaman, 2010). The major component of poultry and quail diets are animal and animal protein sources, which are available in comparatively greater quantity and can be efficiently incorporated in poultry and quail diets. Among vegetable protein sources, the soybean meal and fish meal are well known due to their best profile of certain essential amino acids (Cromwell, 1999). The use of soybean meal and fish meal in poultry rations is limited due to its high cost, dependency on import, tariffs and import duties, with no assurance and anti-nutritional factors like trypsin inhibitors and presence of complex carbohydrates (Swick, 1999). Use of vegetable protein ration combined with other cereal grains (corn, beans and cotton seed) in the ration of laying chicken will provide many benefits among others to increase the number and quality of eggs as well as serve as a source of vitamins and minerals that can improve the health of poultry. These reasons led researchers to search for some alternate good sources of vegetable proteins.

Among vegetable protein meals for animal, legume stands second and one of them is *Indigofera tinctoria*. From previous study it was well known that *indigofera tinctoria* is a type of legume that contains crude protein and energy is high enough and commonly used to feed especially goats, sheep and cattle (Tarigan dan Ginting, 2011). Use *indigofera tinctoria* in poultry rations as a protein source can be possible if accompanied by processing and supplementing with other ration ingredients. Use *indigofera tinctoria* in the ration of

However, the main problem of *Indigofera tinctoria* is a low viability during seedling. This is the limiting factor to grow *Indigofera tinctoria* in field and affect the nutritive value as a potential protein source for poultry. The present research is designed to evaluate the viability of *Indigofera tinctoria* during seedling period by soaking in auxin hormone. In addition to animal nutrition, the present research also investigate various levels of *Indigofera tinctoria* and their impact on egg production, fertility, hatchability and haugh unit of quail and laying chicken.

## Materials and Methods

The first study using *Indigofera tinctoria* seeds that have been selected, Auxin and media without the use of organic and chemical fertilizers. Before planting in poly bags, *Indigofera tinctoria* seeds soaked with auxin hormone and treatment were the control (without soaking), B (12 hours), C (24 hours) and D (32 hours) of soaking. Furthermore, the control seeds, B (12 hours), C (24 hours) and D (32 hours) were planted in the planting medium in poly bags and observed the seed viability for 8 weeks and transferred to the field for 4 months. The leaves harvested for proximate analysis to determine level of nutrients content. In the second study, the treatment of supplement of *Indigofera tinctoria* in quail and chicken ration were 2, 4 and 6%. Parameters were egg production and egg quality. All data obtained were analyzed using analysis of variance (Steel and Torrie, 1995).

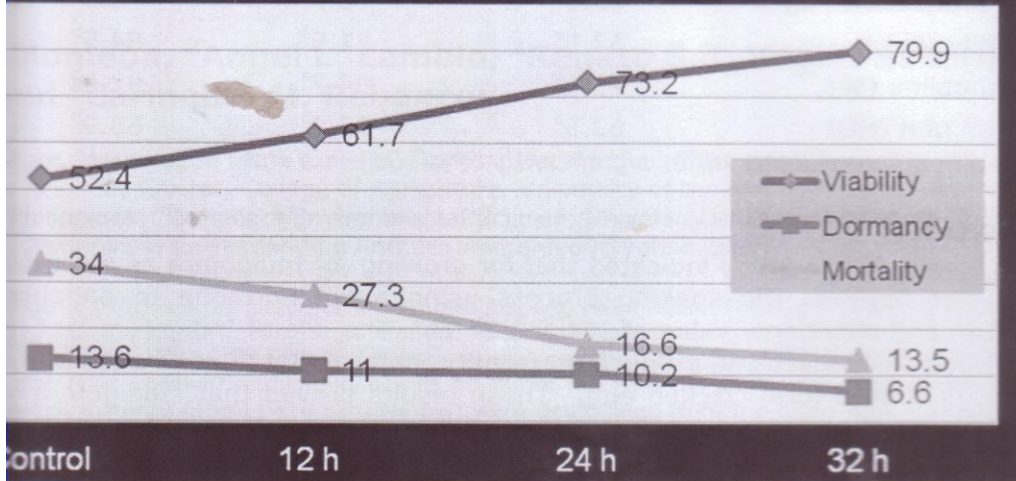
## Results and Discussion

### Viability and content of Nutrition

The result of first study showed that soaking treatment of seed by auxin hormone significantly ( $P < 0.01$ ) increased the viability and leaf nutrient content of *Indigofera tinctoria*. The viability of *Indigofera tinctoria* during seedling increased more than 25% after treatment with auxin hormone for 32 hours. Soaking in auxine hormone from 12 to 32 hours caused a decrease in the percentage of seed dormancy and mortality of *Indigofera tinctoria* (Chart 1).

From this study it was known that that the low viability of *Indigofera tinctoria* seedling which has been very difficult to grow due to the perishable nature of the seed can be overcome by soaking in auxin hormone. The soaking treatment also affected its viability to grow due to the absorption of auxin hormone into seed fiber depend on soaking duration. Treatment of soaking in auxin hormone also stimulated the growing speed of *Indigofera tinctoria* in field. These conditions support the production of leaves during the growth and lead to nutritional quality of the leaves increased particularly dry matter content and protein content of *Indigofera tinctoria* (Table 1.)

**Chart 1. Effect of different duration of soaking in Atonik liquid on viability, dormancy and mortality of *Indigofera tinctoria* (%)**



**n, Fertility and Hatchability**

second study the effect of supplementation of *Indigofera* leaf in quail ration significantly increased in production, fertility and hatchability of quail and chicken with the increase in the percentage of the percentage *Indigofera* in the ration. In the treatment of 2-6% *Indigofera* leaf in the ration increased the egg production by 10%, fertility and 10% of hatchability for egg quail (Table 2). The supplement of 2-6% *Indigofera* leaf also increased egg production, fertility and hatchability of local chicken. It is concluded that supplement of 2-6% *Indigofera* leaf increased the haugh unit of egg

This phenomenon showed that *Indigofera tinctoria* contained not only protein and increased fertility and hatchability but it was also important to supply vitamins in the ration. This also indicated that combination of *Indigofera* and other materials in the ration can meet the nutritional requirement in the ration such as protein, amino acids (A and E) and minerals (micro and macro minerals) related to the egg production. This is in line with the opinion (Gerber, 2010; Hussen *et al.*, 1999) that the ration formulated by vegetables and cereals rich in amino acids, vitamins and minerals can increase the fertility and hatchability of eggs. Leaf protein is a good source of amino acids, methionine being a limiting factor and also be rich in polyphenols (Falco *et al.*,

**Table 2. Effect of supplementation of *Indigofera* powder in quail ration on egg production, fertility and hatchability**

| Parameters         | Control (0%)      | A (2%)            | B (4%)            | C (6%)            |
|--------------------|-------------------|-------------------|-------------------|-------------------|
| Egg production (%) | 61.3 <sup>a</sup> | 62.2 <sup>a</sup> | 64.7 <sup>a</sup> | 67.6 <sup>b</sup> |
| Fertility (%)      | 67.9 <sup>a</sup> | 69.4 <sup>a</sup> | 78.3 <sup>b</sup> | 84.9 <sup>b</sup> |
| Hatchability (%)   | 87.7 <sup>a</sup> | 88.3 <sup>a</sup> | 94.6 <sup>b</sup> | 97.5 <sup>b</sup> |

Different letter differ significantly ( $P < 0.01$ ) in a row

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